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Agricultural Research Administration

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY'S

S O U T H E R N R E G I O N

LIST OF PUBLICATIONS AND PATENTS

July-December 1952

Single copies of available reprints may be obtained upon request. Copies of patents may be purchased from the U. S. Patent Office, Washington, D. C.

Southern Regional Research Laboratory, New Orleans, La.

Sugarcane Products Laboratory, Houma, La.

Tung Oil Laboratory, Bogalusa, La.

Naval Stores Station, Olustee, Fla.

Citrus Products Laboratory, Winter Haven, Fla.

Food Fermentation Laboratory, Raleigh, N. C.

Fruit and Vegetable Products Laboratory, Weslaco, Texas

Southern Regional Research Laboratory
2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY'S

SOUTHERN REGION

The Southern Regional Research Laboratory was authorized by Congress in 1938 as one of four regional laboratories to develop new and extended outlets for farm crops. It is a unit of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

The U-shaped brick building, located on a 40-acre tract of land donated by the City of New Orleans, and containing nearly 4 acres of floor space, was completed in 1941.

The crops studied are cotton lint, cottonseed, rice, sweetpotatoes, sugarcane, peanuts, and other oilseeds grown in the South. The Laboratory also is headquarters for six field stations investigating citrus and other fruits, cucumbers and other vegetables, tung fruit, sugarcane, and pine gum. The States served are Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

Developments at the Southern Laboratory -- many of which have been put to work for the farmer and industry -- include a new machine for opening and fluffing bales of cotton before cleaning for spinning at textile mills; a loom attachment for weaving naturally waterproof cotton fabrics; acetylated cotton highly resistant to mildew, rot, and heat; a "disappearing" cotton yarn, strong enough to weave but soluble in water; information demonstrating that dyed and printed fertilizer bags have re-use value in making wearing apparel; an improved elastic bandage; a machine to cut short-staple cotton and cotton wastes into a linter-like product; improved methods for extracting Southern oilseeds; information to aid peanut butter manufacturers; processing data on fibers and glues from cottonseed and peanut protein, oil from rice bran, and starch from sweetpotatoes; plus many advances in the knowledge of chemistry, physics, and engineering.

Research at field stations has contributed to commercialization of frozen citrus concentrates and fresh-pack cucumber pickles; and to improvements in pine gum processing that have modernized the naval stores industry.

Cotton

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No.

COTTON

Fiber and Fundamental Investigations

1 GRANT, J. N.

FIBER STRENGTH AND YARN STRENGTH (TEST INTERPRETATIONS IMPROVED BY KNOWLEDGE OF FIBER DIFFERENCES). Textile Indus. 116(7): 96-97. 1952.

Prediction of yarn strength from fiber strength depends partly on the testing method. Selecting the longer fibers from a sample can bias the results of the test, since the strength of long fibers was found to be nearly always greater than that of short fibers in the same sample. It was learned that the average elongation-at-break of fibers of different varieties and the effect of twist on the strength of yarns produced from different cottons varied. Such information permits a better interpretation of results obtained in present tests and provides a basis for the development and use of improved testing methods.

2 GRANT, J. N., MORLIER, O. W., and SCOTT, J. M.

EFFECTS OF MECHANICAL PROCESSING OF COTTON ON THE PHYSICAL PROPERTIES OF FIBERS. Textile Res. Jour. 22(10): 682-687. 1952.

Fibers from ginned cotton and from 16/2s yarn from cottons of different physical properties were tested as a bundle and as individual fibers to determine whether changes in properties, if any, could be attributed to the mechanical processing. Data on tenacity, length array distribution, and crystal alignment revealed no consistent differences between the cottons before and after processing. The maturity of carded cottons was slightly lower. Weight fineness and breaking load of individual fibers were unchanged, but elongation-at-break was decreased. A higher modulus in tension was obtained from load-elongation curves of processed fibers, with the greatest difference found for loads below 2 g.

3 HOFFPAUIR, C. L.

COTTON'S MINOR CONSTITUENTS -- THEIR ROLE IN UTILIZATION. Textile Indus. 116(8): 109-113. 1952.

Cellulose accounts for 88 to 98% of the dry weight of raw cotton. Noncellulosic constituents include wax, protein, salts of inorganic and organic acids, pectic acid, and sugars. The presence of these substances affects the properties of the fiber in relation to mechanical processing, as well as the properties of the finished goods. Their removal by finishing operations is usually necessary to obtain the most satisfactory end-use products.

No.

4 HOPPER, T. H.

CHECK SAMPLE TESTING OF PHYSICAL PROPERTIES OF COTTON WITH INSTRUMENTS (A SUMMARY REPORT PREPARED FOR THE TASK GROUP ON INTERLABORATORY CHECK SAMPLE TESTING OF COTTON FIBERS).

(Foreword by W. M. Scott,* Chairman) Textile Res. Jour. 22(7): 472-475. 1952.

Increased use of instruments for the measurement of length, strength, and fineness of cotton indicates need of a uniform level of testing within a laboratory and between laboratories. To learn the uniformity with which results are obtained by use of the Fibrograph, Pressley, and Micronaire, a Task Group was appointed by Committee D-13, Subcommittee A-1-1, Cotton and Its Products, of the American Society for Testing Materials, to conduct a program of interlaboratory check sample testing, each laboratory to follow its regular test procedures. Results of the first tests indicate need for greater standardization.

5 MAGNE, F. C., and SKAU, E. L.

NONFREEZING WATER AND NONFREEZING BENZENE CAPACITIES OF COTTONS AND MODIFIED COTTONS. Textile Res. Jour. 22(11): 748-756. 1952.

The calorimetric, heat-of-fusion method has been used to determine the nonfreezing water present in cotton and modified cotton fibers at various moisture contents. On desorption at room temperature all of the water which will freeze at -4.5°C . is removed before the fibers release nonfreezing water. In general, the results indicated that the nonfreezing water capacity was related to the total available surface, the proportion of amorphous cellulose, and the degree of distention of the wetted fibers. The nonfreezing benzene values seem to refute the solvent theory and to corroborate the theory of capillarity for explaining the lowered activity of benzene in cellulose and, by implication, the lowered activity of water in cellulose.

6 REEVES, R. E., BARRETT, B. J., and MAZZENO, L. W. JR.

THE HETEROGENEOUS HYDROLYSIS OF HIGHLY METHYLATED COTTON CELLULOSE. Amer. Chem. Soc. Jour. 74(18): 4491-4494. 1952.

Upon heterogeneous hydrolysis highly methylated cotton celluloses decrease sharply in viscosity (in chloroform solution); pass through minimum values; and, upon prolonged hydrolysis, show increases in viscosity. Different minimum viscosities for different batches of methyl cellulose are attributed to different crystallite dimensions produced during the methylation procedure; this explanation is supported by the x-ray diffraction patterns of the methyl celluloses. The initial viscosity decreases are regarded as due to chain scission; the later increases as due to the more rapid destruction of the lowest viscosity material.

* Assistant Chief, BAIC

No.

- 7 TALLANT, J. D.

USE OF A SERVO SYSTEM FOR AUTOMATIC OPERATION OF THE FIBROGRAPH.
Textile Res. Jour. 22(9): 617-619. 1952.

The Fibrograph can be converted to automatic operation by using a small, low-speed motor to drive the left handwheel and by replacing the galvanometer and manual operation of the right handwheel with a servo system to maintain balance by driving this handwheel. The accessories required are rugged and are commercially available. Smoother curves are obtained by this method, and the operator is free to comb the next test sample while the curve is being drawn.

- 8 TRIPP, V. W., and ROLLINS, M. L.

MORPHOLOGY AND CHEMICAL COMPOSITION OF CERTAIN COMPONENTS OF COTTON FIBER CELL WALL. Analyt. Chem. 24(11): 1721-1728. 1952.

By mechanical beating or differential solution, the primary wall (with cuticle), winding, and lumen contents of the cotton fiber were isolated. The light microscope, with polarizing attachments, was used to locate and characterize these components; the electron microscope was used to observe structure. Limited qualitative and quantitative chemical analyses were carried out. The primary wall consists of a felted network of cellulose fibrils about 200 A. in diameter, embedded in a matrix of pectic, nitrogenous, and waxy substances. Mineral matter and curtin occur in traces. The winding appears to be cellulose; its organization is fibrillar, of a pattern differing from that of the primary or secondary wall. Lumen contents, the protoplasmic remains, contain considerable protein; though tubular in form, no organized fine structure was discerned.

Mechanical Processing

- 9 CORLEY, J. R., and SIMPSON, J.

DRAFT PROPORTIONMENT FOR COARSE, SHORT-STAPLE COTTON WITH LONG-DRAFT ROVING SYSTEMS. Textile Indus. 116(12): 125-131. 1952.

New draft guides for manufacturing roving from a representative coarse, short-staple cotton with 3 long-draft roving systems are presented. Tests are described which demonstrated the improvement of roving and yarn evenness achieved by use of the new proportions, as contrasted to results with the proportions given in the manufacturers' guides for the 3 systems.

No.

10 FIORI, L. A.

COTTON FIBER PROPERTIES -- A KEY TO PROCESSING DIFFICULTIES.
Ann. Meeting Amer. Cotton Congr. Proc. June 19-21.
Pages 38-45. 1952.

Processing problems and fiber properties are defined; and the effect of the development of rapid, new testing techniques is discussed. Some specific processing problems in relation to fiber properties and their investigation at the Southern Regional Research Laboratory and elsewhere are described. The importance of considering the effects of fiber fineness on processing is stressed. The complete utilization of fiber properties in processing should lead to better cotton products with maximum efficiency.

11 MAYER, M., JR., KYAME, G. J., and BROWN, J. J.

IMPROVE YOUR FABRICS -- WITH THE SRRL LOOM ATTACHMENT.
Textile World 102(7): 114-115. 1952.

This Laboratory, using a German weaving device as a basis, produced an inexpensive loom attachment to weave lightweight cotton fabrics that are almost waterproof; fabrics of a uniform quality having few reed marks; and fabrics of increased breaking strength. Pickage can be increased as much as 38% above normal. The principle of the attachment follows the pattern of the well-known method of raising the level of the warp line where additional tension is applied to a part of the warp at the beat-up.

No.

- 12 RUSCA, R. A., and YOUNG, R. C.
FIBER DOFFING DEVICE. U. S. Patent No. 2,607,958: August 26, 1952.

The invention is a device for doffing (removing) fibrous materials (cotton) from rotating processing cylinders, such as toothed, spiked, fluted or smooth rolls. It is especially applicable to doffing cotton from a cotton-working machine patented by this Laboratory (U. S. Patent No. 2,365,793; 1944). A toothed cylinder is so designed that it will positively engage and doff fibers from other cylinders and at the same time doff the fibers from itself solely by the action of centrifugal forces. The invention eliminates the difficulties of adjustment, maintenance, and initial expense experienced by prior art which used air suction or air pressure or brushes for doffing fibrous materials.

Chemical Processing

- 13 DAUL, G. C., and REID, J. D.
POLYVINYL PHOSPHORIC ACID ESTERS OF CELLULOSE AND PROCESS
FOR MAKING THE SAME. U. S. Patent No. 2,610,953: September
9, 1952.

The invention provides for the production of ion-exchange textiles, comprising textiles of fibrous cellulose esters composed of cellulose partially esterified with polyvinyl alcohol partial esters of orthophosphoric acid, in which a plurality of phosphate radicals is each attached to a polyvinyl alcohol radical by single ester linkage. The textiles have a relatively high ion-exchange capacity and can be prepared in the form of cloths, fabrics, and the like having textile properties substantially comparable to those of cotton textiles.

- 14 DAUL, G. C., and REID, J. D.
PROCESS OF MAKING SOLUBLE YARNS AND THREADS OF PARTIALLY CARBOXY-
METHYLATED COTTON. U. S. Patent No. 2,617,707: November 11,
1952.

To produce water-soluble carboxymethylated cellulose textiles, a cellulosic sliver, yarn, or fabric is reacted with monochloroacetic acid in the presence of aqueous alkali, until 1 carboxymethyl group per from 1 to 3 glucose units is introduced. The reactants are removed by washing with an organic solvent, such as alcohol.

No.

- 15 DAUL, G. C., REINHARDT, R. M., and REID, J. D.
STUDIES ON THE PARTIAL CARBOXYMETHYLATION OF COTTON. Textile Res.
Jour. 22(12): 787-792. 1952.

Additional studies of partial carboxymethylation of cotton showed that relatively small amounts of monochloroacetic acid, properly applied, alter the properties of cotton considerably. Pilot-scale carboxymethylation of cloth showed that it is possible to use standard textile machinery in the process. The cloth resulting from this treatment had a crisp hand with a slightly starched feel. It was found that the tensile strength and elongation of treated cotton are increased, that dyeing properties are changed, that soiling-resistance and soil removal are increased; and that the treated materials are unaffected after 1 year's storage.

- 16 DAUL, G. C., REINHARDT, R. M., and REID, J. D.
CREASE-RESISTANT CLOTH FROM PARTIALLY CARBOXYMETHYLATED COTTON.
Textile Res. Jour. 22(12): 792-797. 1952.

When resin treatments are applied to the acid form of partially carboxymethylated cotton cloth, to produce crease-resistance, the carboxyl group supplies a built-in catalyst, making the addition of catalyst unnecessary, in this way avoiding the prepolymerization of resin baths which contain added catalysts. The high swellability of the modified cotton allows easier penetration of the resin-formers and larger pickup of resin, with the production of cloth of equivalent crease-resistance, and superior in most other physical properties to unmodified, resin-treated cloth. The process of carboxymethylation (impregnation of cotton cloth with a weak solution of monochloroacetic acid followed by treatment with strong sodium hydroxide) is commercially feasible and can be carried out on ordinary textile equipment.

- 17 DEAN, J. D., FLEMING, C. M., and O'CONNOR, R. T.
EFFECTS OF UNFILTERED CARBON ARC LIGHT IN ACCELERATED WEATHERING
OF COTTON AND OTHER TEXTILES. Textile Res. Jour. 22(9): 609-
616. 1952.

The degradative effects produced in cotton and other fibers by unfiltered light from a "Sunshine" type carbon arc lamp were compared with those which occurred in identical materials during natural weather exposure in which sunlight is believed to be the chief degrading factor. The comparative tests were designed to afford needed information about the action of short-wave radiation on textiles, and to evaluate the practical utility of such radiation in accelerated weathering techniques.

No.

- 18 GOLDTHWAIT, C. F., MURPHY, A. L., LOHMANN, E. W., and SMITH, H. O.
MERCERIZATION OF YARN -- EXPERIMENTAL APPARATUS AND TECHNIQUES.
Textile Res. Jour. 22(8): 540-548. 1952.

Balance-type and frame-type apparatuses and general methods for the experimental mercerization of cotton yarn in skeins weighing up to about 3/4 lb. are described and illustrated. Special techniques, including the use of a strain gage, are given for measuring the tension developed in yarn during mercerizing. This measurement is expected to supplement the usual observations of luster, dyeing capacity, and gain of strength of mercerized yarn. Observation of the tension developed can also be employed to indicate the rate of mercerizing and to show differences between cottons.

- 19 GRANT, J. N.
PHYSICAL PROPERTIES OF CHEMICALLY MODIFIED COTTONS. Address before the Cotton Research Clinic, Finchurst, N. C. February 1952. Published in "The Cotton Research Clinic 1952", pages 55-57.

The effect of chemical modification on the physical properties of fibers and yarns was studied through tests on 6 cottons from commercial production, representing a broad range in physical characteristics. Samples of SxP, Acala 1517, Stoneville 2B, Coker 100 Wilt, Deltapine, and Rowden 41B, were processed into yarns of 16/2 construction, and 60-yard skeins were acetylated, mercerized, carboxymethylated, decrystallized, and aminized. From measurements of length, breaking load, weight per unit length, and elongation-at-break of yarns and individual fibers taken from the yarns, the tenacity and stress-strain ratio-at-break were calculated. Fiber tenacity by the flat-bundle method also was determined.

- 20 GUTHRIE, J. D.
ION EXCHANGE COTTONS. Indus. and Engin. Chem. 44(9): 2187. 1952,

Phosphorylated cotton, made by the action of phosphoric acid and urea, is a cation-exchanger with pH values at half capacity of 1.5 and 7.5 for the first and second hydrogen. Sulfoethylated cotton, made by the action of 2-chloroethylsulfonic acid in the presence of sodium hydroxide, is a cation-exchanger of the strong acid type, having a pH value at half capacity of 0.5. Partially carboxymethylated cotton and the succinic acid half ester of cotton are cation-exchangers of the weak acid type having pH values at half capacity of 3.7 and 4.8. Anion exchangers include: aminized cotton, made by the action of 2-aminoethylsulfuric acid in the presence of sodium hydroxide; aminized-iminized cotton, made by the action of ethylenimine on aminized cotton; and quaternary aminized cotton, made by the action of methyl iodide on diethylaminocethylated cotton. Possible uses of ion exchange cottons in the form of loose fiber, roving, yarn, or fabric are discussed.

No.

OILSEEDS AND OTHER OIL-BEARING MATERIALS

Properties and Composition

- 21 CONDON, M. Z., ANDREWS, F. M., and ALTSCHUL, A. M.
THE MEASUREMENT OF OXIDATION-REDUCTION POTENTIALS OF COTTONSEED
SLURRIES. Plant Physiol. 27(3): 500-506. 1952.

In the method described, the importance of exercising care in the construction and cleaning of the platinum electrodes and the necessity of preparing the slurry under purified nitrogen are emphasized. Platinum electrodes, sensitive for approximately 20 experiments with resting seed, are "poisoned" after only one experiment with 5-day cotton seedlings. The potential-time patterns obtained with cottonseed slurries vary with chemical treatment and length of time of germination as well as with the age of the seed.

- 22 HOLMES, R. L., MINOR, J. C., and MCKINNEY, R. S.
CHEMICAL COMPOSITION OF TUNG HULLS AND SCREW-PRESS CAKE. Amer.
Tung Oil Assoc. Ann. Proc: 42-48. October 8-10, 1952.
Processed.

The outer hull, inner hull, and shell of fresh tung fruit and of fruit weathered up to 6 months were analyzed for pentosans, lignin, cellulose, a-cellulose, nitrogen, potash, phosphoric acid, ash, hot-water solubles, alcohol-solubles, copper, iron, and manganese, to obtain information on the possible utilization of the byproduct hulls from tung mills. Twenty-five samples of cake, one or more from each of the 14 mills operating in the United States, were analyzed for oil, crude fiber, pentosans, nitrogen, ash, phosphoric acid, and potash.

- 23 HOLMES, R. L., MINOR, J. C., and MCKINNEY, R. S.
THE DETERMINATION OF MOISTURE IN TUNG FRUIT. Amer. Oil Chem.
Soc. Jour. 29(10): 425-427. 1952.

Six methods for making this determination are compared. The highest, and probably most reliable, moisture values were obtained by drying the ground fruit in the vacuum oven at 101° C. for 2.5 hours under 12-mm. pressure, and by the Karl Fischer titration method. The vacuum oven method is simpler and generally preferable. Results obtained in the forced-draft oven method were low because of oxidation of the oil in the samples. For routine analysis, heating the ground sample in a hot air blower for 15 minutes at 126.7° (260° F.) and adding a correction of 1.35% to the percentage of moisture obtained gives sufficiently accurate values for factory control purposes.

No.

Processing and Storage

- 24 DECKBAR, F. A., JR., PERSELL, R. M., POLLARD, E. F., and GASTROCK, E. A.

A REVIEW OF THE COMMERCIAL AND EXPERIMENTAL PROCESSING OF OIL-BEARING MATERIALS. Cotton Gin and Oil Mill Press 53(15): 13-15, 17, 48, 50-51, 54-56, 58-62. 1952.

Information on the processing of 43 oil-bearing materials, with statistics on their production, oil content, and uses, is given. The materials are discussed in these 4 categories: Available domestically and commercially processed; important in world trade and imported only; processed abroad, available domestically, but processed either not at all or little; under domestic agricultural development, but as yet processed either in the pilot plant or on a limited commercial scale. In the last category, sesame seed, safflower seed, sunflower seed, and castor beans seem to be increasing in importance.

- 25 GARDNER, H. K., D'AQUIN, E. L., PARKER, J. S., and GASTROCK, E. A. FLAKE FEEDING DEVICE FOR SOLVENT-EXTRACTION OF OIL-BEARING MATERIALS. Indus. and Engin. Chem. 44(9): 2261-2264. 1952.

The device was developed to feed flaked oil-bearing materials to a pilot-plant size solvent extractor: To provide a continuous, uniform discharge of the material which can be varied over a 2.5 to 1 range; to form a positive seal plug to prevent the escape of solvent vapors at the point of entry of the material; and to cause a minimum breakage of the material into very small particles. The device operated satisfactorily with flakes from cottonseed, peanuts, okra seed, and rice bran, and is of a type suitable for feeding a wide variety of materials other than oilseed flakes or meats. Scaling up to commercial size should be feasible.

- 26 GASTROCK, E. A., D'AQUIN, E. L., and SPADARO, J. J. OPERATING FEATURES OF FILTRATION-EXTRACTION AND OTHER SOLVENT-EXTRACTION PROCESSES. Oil Mill Gazetteer 57(1): 26-29. 1952.

The unit operations required and material residence time for each, the sequence of these operations, and the cumulative material residence time for both the preparation and the extraction phases are compared for filtration-extraction and conventional direct and prepress solvent processes. Filtration-extraction, by utilizing cooking, does not require meticulous preparation of flakes. While prepress extraction recovers slightly more oil, filtration-extraction eliminates the need for pressing, oil screening, grinding, and conditioning, and the power and equipment required for conducting these operations.

No.

- 27 GASTROCK, E. A., EAVES, P. H., and D'AQUIN, E. L.
MATERIAL BALANCES FOR FILTRATION-EXTRACTION AND FOUR CONVENTIONAL
METHODS OF PROCESSING COTTONSEED. Oil Mill Gazetteer 57(1):
62-63. 1952.

Comparative material balances for filtration-extraction and for hydraulic pressing, screw pressing, direct solvent extraction, and pre-press solvent extraction are presented to illustrate differences of the processes in yields of products, processing costs, and fixed costs.

- 28 GASTROCK, E. A., PERSELL, R. M., and POLLARD, E. F.
BREAK-EVEN CHART VALUABLE IN OPERATION OF OIL MILL. The Cotton
Trade Jour. 34(49): 6. 1952.

In a simple, graphical method of analyzing the operating results of a mill, which has been used at this Laboratory as a tool of evaluation in oilseed process investigations, a chart shows the point where the total costs line crosses the total income line. This is the break-even point.

- 29 PERSELL, R. M., POLLARD, E. F., DECKBAR, F. A., JR., and GASTROCK, E. A.
A PRELIMINARY COST STUDY OF THE FILTRATION EXTRACTION OF
COTTONSEED. Cotton Gin and Oil Mill PRESS 53(17): 18,20.
1952.

This study indicates that the cost of a filtration-extraction plant processing 100 tons of cottonseed a day would be in line with that of comparable conventional direct solvent-extraction plants, with some savings in favor of the filtration-extraction process. A high degree of mechanization and low supervision and operating costs can be anticipated in filtration-extraction plants. The production of oil and meal of high quality will ensure maximum returns from the products.

Glyceride Oils and Fatty Acids

- 30 ALTSCHUL, A. M., and FREEMAN, A. F.
BROAD ASPECTS OF TUNG UTILIZATION RESEARCH. Amer. Tung Oil Assoc.
Ann. Proc. 49-54. October 8-10, 1952.

Processing research is needed on mill analyses for materials balance of oil throughout processing; processing procedures to increase the yield of oil; means to reduce costs; and methods of preventing or minimizing deterioration of stored fruit and stored hulled fruit. Utilization research is needed on improved methods of compounding tung oil in final products, to aid its competitive position in the protective-coating industry; data on tung oil and its fatty acids, to lead to new uses which would take full advantage of the chemical structure of its unique constituent, eleostearic acid;

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identification of the minor constituents of tung oil, to reveal, possibly, valuable products for industrial or pharmaceutical purposes; and the development of new and improved uses for the hulls and meal.

- 31 BOUCHER, R. E., and SKAU, E. L.

PHASE RELATIONS IN THE SOLVENT WINTERIZATION OF MOLECULARLY
REARRANGED PEANUT OIL AND COTTONSEED OIL. Amer. Oil Chem.
Soc. Jour. 29(9): 382-385. 1952.

Systematic phase-relation data, obtained to determine the effect of either mild or extensive molecular rearrangement on the winterization behavior of peanut or cottonseed oils, show that if the molecular rearrangement step is introduced before solvent winterization, larger percentages of solid must be removed to obtain a winterized oil, especially for cottonseed oil; lower yields result; lower chilling temperatures and longer chilling periods are required, partly because of a lower rate of crystallization; and the settling qualities of the solid separating are markedly impaired.

- 32 BOUCHER, R. E., and SKAU, E. L.

PHASE RELATIONS IN THE SOLVENT WINTERIZATION OF COTTONSEED OIL
IN 85-15 ACETONE-HEXANE MIXTURE AT REDUCED HOLDING-TIMES.
Amer. Oil Chem. Soc. Jour. 29(11): 455-456. 1952.

Systematic winterization data were obtained on a laboratory scale for different oil-solvent ratios and temperatures using a technique previously described (see AIC-319, supplement No. 2, item No. 22). The results indicated that under the static chilling conditions used, the holding-time can be reduced from 3 hours to one by using either a higher oil concentration, a lower chilling temperature, or both.

- 33 DECHARY, J. M., KUPPERMAN, R. P., THURBER, F. H., and ALTSCHUL, A. M.

REMOVAL OF GOSSYPOL FROM COTTONSEED BY SOLVENT-EXTRACTION
PROCEDURES. Amer. Oil Chem. Soc. Jour. 29(8): 339-341.
1952.

The relative efficiencies of organic, polar solvents and of solvent-water pairs for use in the extraction of gossypol and related compounds from cottonseed flakes were determined in a specially devised glass laboratory extractor. A butanone-water pair containing 10% of water by volume was the most effective, and chlorine-substituted hydrocarbons were the least effective. Flakes extracted at 26° C. contained 0.08% free gossypol and those extracted at 71°, 0.054%. This decrease may be due, in part, to the reaction of gossypol with the protein to form bound gossypol.

No.

- 34 GROS, A. T., and FEUGE, R. O.

SURFACE AND INTERFACIAL TENSIONS, VISCOSITIES, AND OTHER PHYSICAL PROPERTIES OF SOME *n*-ALIPHATIC ACIDS AND THEIR METHYL AND ETHYL ESTERS. Amer. Oil Chem. Soc. Jour. 29(8): 313-317. 1952.

Surface tension, interfacial tension against water, viscosity, density, and refractive index were determined at 75° C. for the saturated, even-numbered, *n*-fatty acids from C₂ through C₁₈ and for the corresponding methyl and ethyl esters. The typical effect of temperature on the various physical constants was demonstrated for one of the fatty acids, myristic acid.

- 35 MACK, C. H., and BICKFORD, W. G.

THE CONIDENDROLS AS INHIBITORS OF OXIDATION AND POLYMERIZATION. Amer. Oil Chem. Soc. Jour. 29(10): 428-430. 1952.

Alpha- and beta-conidendrol have been tested and compared with accepted stabilizers as antioxidants for the prevention of rancidification in fats, oils, and fat-containing candies; as stabilizers against aging and resinification in GR-S type polymers; and as additives for inhibiting the polymerization of vinyl-type monomers. Accepted acceleration tests were employed. The conidendrols were approximately equal or superior to other stabilizers in current use in their respective fields. They are produced from a raw material which is in abundant supply and offer the possibility of supplementing or replacing stabilizers derived from benzene or naphthalene.

- 36 MCD, R. R., and SKAU, E. L.

BINARY FREEZING-POINT DIAGRAMS FOR ACETAMIDE WITH OLEIC AND ELAIDIC ACIDS. Jour. Phys. Chem. 56(8): 1016-1017. 1952.

Complete binary freezing-point data have been obtained for the stable and unstable forms of acetamide with elaidic acid and with the stable and unstable forms of oleic acid. The diagrams show that acetamide forms a molecular compound with both elaidic (trans) and oleic (cis) acid. Each of these compounds exhibits two incongruent melting points, the one stable and the other metastable. The diagrams show also that the oleic acid compound tends to dissociate less than the elaidic acid compound.

- 37 O'CONNOR, R. T., STANSBURY, M. F., DAMARE, H. G., and STARK, S. M., JR.

A STUDY OF THE SPECTROPHOTOMETRIC METHOD FOR POLYUNSATURATED FATTY ACIDS IN COTTONSEED OILS AND A COMPARISON WITH CHEMICAL METHODS. Amer. Oil Chem. Soc. Jour. 29(11): 461-466. 1952.

The fatty acid composition of 48 cottonseed oils, representing a random distribution with respect to variety, station, year of growth, and iodine values from 89.8 to 117.0, was determined by the spectrophotometric method. Equations for calculating linoleic acid from spectrophotometric data were examined, and a simplified

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equation is recommended for its calculation in cottonseed oils and other vegetable oils containing no linolenic acid. A procedure whereby the linolenic acid content is first calculated from the spectrophotometric data is suggested as a criterion for use of the simplified equation. The percentages of linoleic, oleic, and total saturated fatty acids were compared with previously reported values obtained by calculations from iodine and thiocyanogen values.

- 38 SINGLETON, W. S., O'CONNOR, R. T., MURRAY, M., and PACK, F. G.
DILATOMETRIC INVESTIGATIONS OF FATS. VII. MELTING DILATION
AND POLYMORPHISM OF AN ALPHA AND BETA TUNG OIL. Amer. Oil
Chem. Soc. Jour. 29(11): 452-454. 1952.

Three polymorphic forms of beta tung oil were established on the basis of their melting points and x-ray diffraction spacings. The interplanar or "d" spacing of each form was calculated from the diffraction lines of the x-ray photographs. The expansibilities of an alpha tung oil and the three polymorphic forms of the beta oil were determined for both the solid and liquid states, and the melting dilations were calculated. The absolute densities of the alpha and beta tung oils were determined, and the absolute specific volumes of all samples at several temperatures over the range of melting were calculated and graphically recorded.

Meals and Proteins

- 39 ALTSCHUL, A. M., and BARINGER, K. L.
BETTER PRODUCTS FROM COTTONSEED THROUGH RESEARCH, AIM OF
PROJECT. The Cotton Trade Jour. 34(50,51,52): 6. 1952.

Aims and results under a cooperative research program between this Laboratory and other Federal agencies, State Experiment Stations, the National Cottonseed Products Association, and cottonseed oil mills, whose objective is to improve the nutritive value of cottonseed meal without impairing oil quality, are described.

- 40 KARON, M. L., ADAMS, M. E., and NEWMAN, S.
THE EFFECT OF TEMPERATURE ON THE ELECTROPHORETIC ANALYSIS OF
COTTONSEED MEAL EXTRACTS. Jour. Colloid Sci. 7(4): 407-
413. 1952.

The electrophoretic patterns of a cottonseed meal extract in the ethylamine barbital buffer (pH 10.4 at 25° C.) have been investigated over the range of 0° to 20°. The results indicate that there is no change in the relative concentrations of the components as a function of temperature. The application of a single viscosity correction to the solvent could not entirely compensate

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for the change in mobility of each component with temperature. The viscosity-mobility product displayed a decrease with increasing temperature. This trend varied irregularly for the several components present.

- 41 STANSBURY, M. F., and HOFFPAUIR, C. L.
ESTIMATION OF SKIN CONTENT OF PEANUT MEALS AND RELATIVE SKIN PIGMENT
CONTENT OF ISOLATED PROTEINS. Amer. Oil Chem. Soc. Jour. 29(9):
370-372. 1952.

The method described is based on the fact that the pigments consist predominantly of a catechol tannin and related compounds, which gave a red product with characteristic absorption when heated with alcoholic hydrochloric acid. Any residue of red skins imparts color to peanut meals and protein products derived from them, which is objectionable in industrial uses. The method may be used to estimate the degree of skin removal in the preparation of peanut meals and also to evaluate proteins for skin pigment content.

RICE INVESTIGATIONS

- 42 LOEB, J. R., and MORRIS, N. J.
ABSTRACT BIBLIOGRAPHY OF THE CHEMISTRY, PROCESSING, AND
UTILIZATION OF RICE BRAN AND OIL. AIC-328. Processed. 1952.

About 300 references are covered, representing the world literature on the subject between 1876-1951. Sources of abstracts are: Journal of the Chemical Society (London), 1876-1916; and Chemical Abstracts (American Chemical Society), 1907-1951.

SUGARCANE AND DERIVED PRODUCTS

Processing

- 43 BALCH, R. T., SMITH, B. A., and MARTIN, L. F.
NOTE ON THE STARCH CONTENT OF LOUISIANA SUGARCANE AND RAW SUGAR.
Sugar Jour. 15(6): 39-40. 1952.

A method which is specific and permits reliable estimates of percentages of starch in properly prepared samples of sugarcane, juices, and sugar, has been used to test 4 samples of plant cane and one of stubble. Starch contents ranging from 0.0008 to 0.0063% on the basis of the whole sample were found for the plant canes and a content of 0.0003% was found for the stubble.

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- 44 FORT, C. A., and SMITH, B. A.

ANALYTICAL STUDIES OF SUGARCANE JUICES PROCESSED ON A PILOT-PLANT SCALE. Sugar Jour. 15(7): 34-39. 1952.

This report covers data obtained during the 1950 and 1951 campaigns on the sugar and nonsugar composition of the raw juices and clarified juices of selected sugarcane varieties. The clarified juices were produced in pilot-plant operations. Subjects reported on are (1) the importance of the suspended material in raw juice in mud production and rise in purity on clarification, (2) elimination of phosphate as related to clarity, (3) the clarification changes in lime, magnesia, and nitrogen, (4) the composition of clarification muds, and (5) the occurrence of unidentified organic nonsugars.

Byproducts of Sugarcane

- 45 FORT, C. A., SMITH, B. A., BLACK, C. L., and MARTIN, L. F.

ACONITIC ACID CONTENT AND COMPOSITION OF LOUISIANA BLACKSTRAP MOLASSES. Sugar 47(10): 33-35. 1952.

This study provides for the first time a reliable estimate of the total amount of aconitic acid available from an annual cane crop. More representative and accurate information on molasses composition has been obtained than has been available from earlier analyses. It is feasible by present methods to recover about one-third of the aconitic acid as calcium-magnesium aconitate, providing 9-11 million pounds of the salt, or 4 1/2 - 5 1/2 million pounds of equivalent aconitic acid per year. Relations of the inorganic constituents to sugars, to total organic nonsugars, and to aconitic acid in particular, have been determined for the 3 different areas of the Louisiana Sugar Belt. Data are presented on a true solids basis permitting more accurate comparisons than are possible from apparent percentages based on Brix, customarily used in the industry.

Confectionery

- 46 MARTIN, L. F.

RESEARCH CAN AID THE COST-PROFIT FIGHT. Western Confectioner 32(7): 11. Research Needed to Reduce Spoilage; Cut Costs; and Increase Production. Candy Indus. 17(2): 8,12,25. The Problem of Improving the Shelf-life of Candy -- Research Contributions Towards its Solution. Address, Natl. Confectioners' Assoc., Chicago, Ill., June 1-5. 1952.

Approaches towards solving the problem of losses up to 5 to 6 million dollars annually in the candy industry from returned goods due to poor storage quality, include proper choice of high-quality raw

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materials, improved formulas and production methods, and the addition of new ingredients. Examples are given of what can be accomplished through research along these lines.

- 47 MARTIN, L. F., ROBINSON, H. M., and FAHS, F. J.
PROGRESS IN CANDY RESEARCH. REPORT NO. 26. Period Covered:
June 1- October 31, 1952. Report on Utilization of Agricultural Products in Confectionery in Cooperation with The National Confectioners' Association. (Processed by Natl. Confectioners' Assco.)

Research has been continued on the modification of starch, jelly gum textures by the addition of the polyoxyethylene stearates as emulsifiers. An oat germ product was added to nougat and could be used in caramel or fudge. Further work is reported on the cut pectin jellies flavored with apple and strawberry essences recovered by processes developed at the Eastern Regional Research Laboratory. Information is given as to possible sources of supply for these products, which are receiving increasing attention as candy flavors. In further cooperative work for the Quartermaster Food Laboratories, efforts are to be directed towards stabilizing hydrogenated coconut oil in ration candies.

FRUIT AND VEGETABLE PRODUCTS

Citrus

- 48 KEW, T. J.
ULTRASONIC TREATMENT OF ORANGE JUICE PRODUCTS. Sixty-Fifth Ann. Meeting Fla. State Hortic. Soc. Proc. Pages 242-246. 1952.

The applicability of ultrasonic energy to the processing of orange juice has been investigated. Gel structure in orange concentrate was destroyed, but cloud was not dispersed. The activity of the enzyme pectinesterase in orange juice products was not affected by ultrasonic treatment. In orange juice vitamin C was not destroyed by the treatment, nor was the color impaired. Off-flavor and off-odor developed in reconstituted orange juice and in orange concentrate.

No.

49 VELDHUIS, M. K.

REDUCTION OF ORGANIC MATTER IN CITRUS PRESS LIQUOR BY AERATED YEAST PROPAGATION. Citrus Indus. 33(9): 11-12. 1952. Also in Engin. Progress Univ. Fla. Indus. Wastes Practices (Fifth Natl. Public Health Engin. Conf. Proc.) May 20, 21, 1952. Bulletin Series No. 57, 6(10): 24-26. 1952.

The action with a continuous method of yeast propagation with Terrulopsis utilis in decreasing the amounts of sugar in citrus press liquor can be completed with a detention time of 2.5 to 3 hours, and the depletion of sugars is virtually complete under a wide range of conditions. However, under some conditions, in addition to yeast, which is removed with a centrifuge, substantial quantities of volatile materials (alcohol and esters) may be formed. The yeast propagation rapidly utilizes the sugars which constitute about two-thirds of the soluble solids in citrus press liquor. The remaining organic materials are likely to consist of pectin, pectic degradation products, glycosides (naringin and hesperidin), and salts of citric acid.

50 VELDHUIS, M. K.

FROZEN CONCENTRATED GRAPEFRUIT JUICE. FROZEN CONCENTRATED BLENDED GRAPEFRUIT JUICE AND ORANGE JUICE, FROZEN CONCENTRATED TANGERINE JUICE. Refrigerating Data Book. Applications Volume. Ed. 4. Sec. I, Chap. 8. Parts II, III, IV. Pages 08-10. Amer. Soc. Refrig. Engin. 1952.

The type of equipment used to make the products, the methods of preparation, and the characteristics of the products are summarized.

Cucumbers

51 BELL, T. A., and ETCHELLS, J. L.

SUGAR AND ACID TOLERANCE OF SPOILAGE YEASTS FROM SWEET-CUCUMBER PICKLES. Food Technol. 6(12): 468-472. 1952.

What is believed to be the first preservation-prediction chart for yeast spoilage in sweet-cucumber pickles has been developed through studies of 35 yeast cultures, responsible for gaseous-type spoilage, which were isolated from 15 samples of sweet pickles made by 3 pickle manufacturers in different locations. The yeasts were identified as being closely related to the species Zygosaccharomyces globiformis. The prediction chart should aid the pickle manufacturers in standardizing sweetening formulas, in reducing spoilage, and in saving sugar.

No.

- 52 ETCHELLS, J. L., COSTILOW, R. N., and BELL, T. A.
 IDENTIFICATION OF YEASTS FROM COMMERCIAL CUCUMBER FERMENTATIONS
 IN NORTHERN BRINING AREAS. Farlowia 4(1): 249-264. 1952.

The yeasts predominating during the fermentation of cucumbers under conditions typical of brining areas in Indiana, Michigan, and Wisconsin have been studied. During three brining seasons (1948-50) 452 yeast isolates were obtained from 155 vat brines collected from 22 individual brining stations, operated by 8 commercial pickle companies. Two species of yeasts occurring during the fermentation were outstanding: Torulopsis holmii and Brettanomyces versatilis. The first yeast predominated during the early period of fermentation (2 to 30 days) and was followed by the second yeast which was most prevalent during the last stage of fermentation (70 to 110 days), but was still present in brines after 12 to 14 months of storage. Between the two extremes in yeast sequence, the species Torulaspora rosei, Hansenula s. pelliculosa, and Zygosaccharomyces halmembris were active.

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PINE GUM AND DERIVED PRODUCTS

53 ANONYMOUS.

FACTS ABOUT THE NAVAL STORES STATION. AIG-345. Processed.
September 1952.

This leaflet describes briefly the location and facilities of the Naval Stores Station in Olustee, Fla.; the nature of its research program; and a few typical accomplishments of the Naval Stores Research Division.

54 GOLDBLATT, L. A.

AMERICAN TURPENTINES. Chap. XX; Pages 253-307; in "The Essential Oils"; edited by Ernest Guenther. D. Van Nostrand Co. N. Y. 1952.

The different kinds of turpentine (gum spirits of turpentine; steam-distilled wood turpentine; destructively distilled wood turpentine; and sulfate wood turpentine) are defined. The production of gum turpentine in the United States and changes in the industry from Colonial days are reviewed. Methods of obtaining, collecting and processing pine gum are described. The physical and chemical properties of the oleoresins and of the turpentines derived from the two species of pines tapped commercially in the United States today are discussed and the compositions of the oleoresins of 30 species of pines native to the United States and of the turpentines derived from these pines are tabulated. Parallel information is given for the other kinds of turpentine.

55 GOLDBLATT, L. A., and BURGDahl, A.

TURPENTINE FROM PONDEROSA PINE. Indus. and Engin. Chem. 44(7): 1634-1636. 1952.

Determinations of the composition of the turpentines obtainable by acetone extraction of stumpwood, and of lumber from Western ponderosa pine show that the two turpentines are similar to each other and differ from all present commercial turpentines. They are 70% Δ^3 -carene; 8% α -pinene; 6% β -pinene; and 8% myrcene. Other compounds present include camphene, α -terpinene, limonene, terpinolene, p-cymene, and benzaldehyde. Inasmuch as Δ^3 -carene is completely absent from all commercial American turpentines, ponderosa turpentine cannot be regarded as a simple replacement. The presence of significant amounts of myrcene is noteworthy, since this is the first time that myrcene, or in fact any branched-chain acyclic hydrocarbon, has been reported to be present in turpentine from pines.

No.

- 56 LAWRENCE, R. V., MILTON,* F., and McKENNON, F. L.
ETHYL MALEOPIMARIC SOAP AS EMULSIFIER FOR GR-S POLYMERIZATIONS.
Indus. and Engin. Chem. 44(7): 1662-1664. 1952.

This study was undertaken to evaluate the polymer formed when sodium ethylmaleopimarate is substituted for the disproportionated rosin soap in the GR-S-10 recipe. The physical properties of the vulcanizates were comparable to those obtained using a commercially available disproportionated rosin soap, and the chemical stability of the latices formed appeared to be greater. The inhibiting effect of conjugated double bonds on the polymerization of GR-S was successfully eliminated in a rosin-derived soap by the Diels-Alder addition of maleic anhydride.

- 57 PARKER, E. D., and GOLDBLATT, L. A.
ACID COMPOSITION OF GUM SPIRITS OF TURPENTINE AND OF LOW WINES.
Indus. and Engin. Chem. 44(9): 2211-2213. 1952.

The acidic components of both the gum turpentine and the low wines the aqueous phase of the turpentine distillate produced simultaneously were studied, because the kind and amount of acids present in the low wines undoubtedly affect the acids present in the turpentine. The acids separated from low wines contained 88% acetic acid, and smaller amounts of formic isobutyric, n-butyric, propionic, caproic (tentative), and valeric (tentative) acids. The water-insoluble acids from a tall cut of turpentine contained chiefly resin acids; but contained at least 4 nonresin acids, three of which have chromatographic properties similar to those of caproic heptanoic, and caprylic acids. The fourth lies between caprylic and heptanoic in adsorption behavior. One of the acids was found to be unsaturated.

- 58 PATTON, E. L.
PINE GUM -- A SOURCE OF NEW CHEMICALS. Naval Stores Rev.
Internatl. Yearbook - 1952. Pages 77-79. 1952.

Terpene hydroperoxides, chemicals showing promise for use in the preparation of synthetic rubber and plastics, and pinic acid, whose esters have been found to be premium-quality lubricants and to have other useful applications, have been developed from turpentine. Superior metal resins have been produced by a method which uses aldehyde-modified rosin. The process for making maleopimaric acid, has been developed to the pilot-plant stage. The effect of acid stimulation of pine gum has been studied. Several promising laboratory methods for removal of acids from turpentine have been found. Emphasized in future work will be basic investigations of pine gum products.

* Government Laboratories, University of Akron, Ohio.

No.

MISCELLANEOUS

59 BLAIR, M. G.

ALCOHOLYSIS OF CELLULOSE WITH 2-METHOXYETHANOL. Amer. Chem. Soc. Jour. 74(13): 3411-3414. 1952.

The extent of cleavage which can be obtained with 2-methoxy-ethanol, a new alcohol, which does not appear to have been used previously for the alcoholysis of any polysaccharide, has been investigated. Its high reactivity makes this alcohol worth consideration as an alcoholytic reagent for polysaccharides, particularly since the use of an autoclave is not required to reach the optimal reaction temperature.

60 DAUL, G. C., and REID, J. D.

PROCESS OF REACTING POLYVINYL ALCOHOL WITH UREA PHOSPHATE. U. S. Patent No. 2,609,360; September 2, 1952.

Novel acid esters of polyvinyl alcohol are produced by heating an aqueous mixture of polyvinyl alcohol and urea phosphate to from 130° to 160°C. until the evolution of water vapor ceases. The esters react with cellulose derivatives, and polymerize to produce high-capacity ion-exchange materials.

61 DECOSSAS, K. M., MOLAISSON, H. J., DECKBAR, F. A., JR., and ASSET, H. L.

ELECTRICAL SYSTEM IN SOLVENT AREA. South. Power and Indus. 70(11): 76, 80. 1952.

The electrical system of an indoor pilot-plant solvent area at the Southern Regional Research Laboratory, covering 5,000 sq. ft., serviced entirely with Class 1, Group D Fixtures, is described. The area comprises 4 oilseed processing plants: a continuous solvent-extraction plant; a continuous solvent crystallization plant; an oil-and-solvent-recovery plant; and a cottonseed fractionation plant. The overall costs of the electrical installation are given.

62 FISHER, G. S., and MORRIS, N. J.

STABILITY TUBE WITH FOAM BREAKER. Analyt. Chem. 24(8): 1384. 1952.

An all-glass stability tube is described which was developed to control excessive foaming during application of the active-oxygen method for the determination of the stability of oils extracted from peanut butter and peanuts. The tube has been used for approximately 2 years satisfactorily.

No.

- 63 O'CONNOR, R. T., and HEINZELMAN, D. C.
APPLICATION OF LINE-WIDTH METHOD OF SPECTROGRAM EVALUATION
TO SPECTROCHEMICAL ANALYSIS OF PLANT PRODUCTS. *Analyt. Chem.* 24(10): 1667-1669. 1952.

A generally applicable method has been devised and evaluated for the ready analysis of plant products. It involves the preparation of ashes sufficiently buffered to permit the evaluation of metallic cations in most plant products from a single set of working curves. It uses an automatic recording microphotometer and measures the line width directly from the profiles on the recorder strip. This modification has simplified and increased the accuracy of this measurement. With its use the line-width method of measurement is satisfactory in reproducibility and permits measurements over a wide range of concentrations.

- 64 SEGAL, L., and JONASSEN, H. B.
EVIDENCE FOR INTERACTION BETWEEN CHLOROFORM AND MONOETHYLAMINE. *Amer. Chem. Soc. Jour.* 74(14): 3697-3699. 1952.

In the decrystallization of cotton, chloroform was used to remove anhydrous monoethylamine from the swollen fibers. The chloroform could be reclaimed easily by removing the ethylamine through neutralization with aqueous acid, but attempts to separate the amine and chloroform by association or by extraction with distilled water proved unexpectedly difficult, suggesting some type of interaction. Experiments undertaken to explain these difficulties are reported.

- 65 WELLBORN, W. A., MOLAISSON, H. J., and D'AQUIN, E. L.
NEWLY DEVELOPED PILOT-PLANT BATCH DEODORIZER HAS MANY USES IN VEGETABLE OIL RESEARCH. *Food Engin.* 24(10): 171. 1952.

A batch deodorizer with a working capacity of 300-600 lb. can be operated at temperatures up to 450°F., vacuums as high as 29.7 inches, and with various amounts and pressures of blowing steam. The unit is 6 feet 2 inches high by 30 inches inside diameter. The shell is constructed of 3/8 inch mild steel.

No.

RESEARCH ACHIEVEMENT SHEETS

Turpentine Farmers Gain from New System for Evaluating Pine Gum.
Res. Achvt. Sheet 154(C). (Processed.) October 1952.

USDA NEWS RELEASES

New Tester Helps in Choosing Cotton Fibers to Get Fabrics that
Wear Well. August 5, 1952. USDA 1693-52.

USDA Naval Stores Station to Hold Open House at Olustee, Fla.
September 5, 1952. USDA 1977-52.

REPUBLICATIONS

ETCHELLS, J. L., JONES, I. D., and BELL, T. A.
YEASTS: BRIGANDS IN BRINE. Res. and Farming 10(1):
Summer 1951. (A condensation of "Advances in Cucumber Pickling,"
Yearbook of Agr. 1950-1951. Pages 229-236. U. S. Dept. Agr.)

KYAME, G. J.

EXPERIMENTAL SLASHER FOR TEXTILES EMPLOYS GAS, INFRARED DRIER.

Under title "Slasher Dryer Using Gas Developed at SRRL":
Textile World 102(8): 143-144. Under title "Infra-Red Dry-
ing Unit for Slasher": Textile Indus. 116(11): 132-133.
Condensation, under title "A Gas-Fired, Infrared Drier for
Slashing." Textile Age 16(3): 68-69. Also in Indus.
Heating. July. 1273-1274, 1276, 1278, 1280. 1952. Pre-
vious publication: Indus. Gas 30(10): 12-13, 31-32. 1952.

